

# The Mining Journal

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## Southern Rhodesia's New Mining Laws

ONE of the most difficult problems in mining legislation is that of striking an acceptable balance between the interests of miners and farmers, who are apt to view such questions as mineral rights and the protection of arable land through vastly different eyes. The farmer on his part still tends to feel that because the land is his, any minerals which may be found on it ought also to be his property, although this is no longer the case in the majority of countries at the present day. The miner, on the other hand, is apt to regard the farmer as an obstructionist interested chiefly in how much compensation he can extract. It might be said that, to some extent, both attitudes are rooted in mining history, inasmuch as it has long been common practice for large tracts of land in the region of, for example, prospective new goldfields to be bought up by "farmer speculators" with no intention of planting a single crop, while on the other hand the interests of the genuine farmer have not invariably been accorded adequate protection by mining laws. The divergence of outlook between the farming and mining communities tends to be further accentuated by the fact that in many countries the mining industry is a major earner of foreign exchange and expects to be treated accordingly, but in fact it is often the local farmer who controls the local politics.

The problems arising from this conflict of interests vary in complexity from country to country. They are perhaps less insoluble in Southern Rhodesia, than in some other countries, because in this part of Southern Africa farming is, generally speaking, a profitable occupation and also because there have been no developments comparable with the spread of the South African gold mining industry into the West Wits line and the Orange Free State to fire the enthusiasm of land speculators. Nor have virgin discoveries of economic deposits in Exclusive Prospecting Areas been such, as yet, as to suggest that the farmer had much real basis for fears that he might have to vacate his homestead due to any find of commercial significance within the very small area surrounding it (one-quarter of one square mile) protected under the existing legislation. Yet in Southern Rhodesia, as elsewhere, the difficulty of arriving at a mutually satisfactory agreement in regard to prospecting on reserved ground has been a major obstacle to the achievement of more harmonious relations between the miner and the farmer.

In Native Purchase Areas, too, the existing law, under certain circumstances, could present almost insuperable bars to the investigation of mineral deposits. In many cases the blocks of ground sold to Africans are about 200 acres in extent, and a ruling by the Mines Department gives the living quarters of an African owner the same legal standing as a European homestead. Consequently, out of a holding of say 201 acres, it is possible that 160 acres could be debarred to prospecting. Yet the establishment of sizeable mining operations in African areas could be the means of opening up remote parts of the country. Moreover, the life of a mine is usually short and when the mine closes down, all but a small area can revert to agriculture.

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Work on the revision of Southern Rhodesia's mining laws started four years ago, when the Minister of Mines appointed a Working Party to consider, and make recommendations on, those aspects of the law which require amendment in the light of modern conditions. In the initial stages, however, the project was brought to a virtual standstill because very few of the Working Party's original recommendations were acceptable to all concerned. It was at this discouraging juncture that the Chamber of Mines and the Rhodesia National Farmers' Union decided to sink their differences and endeavour to work out an acceptable formula. Thenceforward the progress of the new legislation became extremely rapid. On September 27, 1960, the new Bill was presented to Parliament and read for the first time. On October 6 it passed the second reading and was referred to a Select Committee. As amended by the Select Committee, the Bill was presented to Parliament for discussion in the committee stage on June 8, 1961, the committee stage was completed on June 15, and the report stage and third reading were taken on June 20.

Hitherto arable land as such has not been protected, but the new Act makes provision for the purchaser of new farms to protect up to 400 acres. As provided for in the Bill as originally drafted, ground within 50 yards of the site of the principal homestead was excluded from the definition of ground reserved against prospecting and pegging, and was therefore made inviolate; this distance has been extended to 250 yards.

Under one of the new provisions, miners wishing to prospect within the principal reservation or any areas normally reserved against prospecting may apply to the Mining Affairs Board for permission, which can be granted under certain conditions and on the furnishing of certain guarantees. Another important innovation is the introduction of mining lease title to enable the owners of properties which can be expected to have reasonably long lives, to obtain an indefeasible block title over the whole property. Among other rights which flow from the granting of mining lease title is the compulsory acquisition by, or sale to, the miner of the land concerned.

Landowners' fees have hitherto been based on moneys received from miners in the form of fees levied by the Department of Mines. Under the new legislation the farmer is assured of compensation at a pre-determined rate for each acre of his land held under mining title.

Of benefit to both miner and farmer are the provisions of a new section which allows them, subject to approval by the Mining Affairs Board, to enter into an agreement whereby the farmer can cultivate a portion of the claims for a stipulated period, that area of the claims covered by the agreement being automatically reserved against mining for the period of the agreement. The rights under any agreement to cultivate are automatically terminated in the event of forfeiture or abandonment of the claims concerned.

By depriving the prospector or miner of the free grazing rights to which he was formerly entitled, the new legislation eliminates what must have been a frequent source of friction, and rectifies what appears to have been a legitimate grievance of the farmer. Under the new Act a prospector or a miner requiring the right of grazing must obtain the approval of the Mining Commissioner and must pay the landowner a grazing fee to be prescribed.

Provision is also made for controlling the siting of all mining surface works, such as buildings, Native locations, plant installations and residue dumps. This will assist not only farmers but also neighbouring miners. The miner will be obliged upon to submit to the Mining Commissioner plans of his proposed layout before work is started.

Any matters arising between farmers and miners will be heard and determined by a Natural Resources Court, and in all important matters such as the compulsory acquisition

of land covered by claims, an appeal will lie to the High Court.

The new Act, which contains as many as 433 new clauses and incorporates many new principles, is expected to come into operation within the next few months. While it may not be perfect in all respects, it is regarded as a considerable improvement on the existing mining laws. Legislators in other mining countries faced with similar, and perhaps in some instances more intractable problems, may well find cause for encouragement in the smooth and speedy progress of this difficult piece of legislation, which could so easily have been shipwrecked by the unfavourable reception accorded to the Working Party's original report.

### MALAYA'S BIGGEST IRON MINE NEAR COMPLETION

A joint Malayan-Japanese team is at present surveying the west coast of Perak to find a site for an iron and steel mill. A company has been formed to operate the mill — Malaywata Steel Ltd. — in which Yawata Iron and Steel Company Ltd. is taking up 49 per cent of the capital, the balance to be found by Malayan interests. Construction on the first stage is planned to commence in October this year and to be completed in March 1964. A rotary kiln will be installed in this stage for which output capacity will be 120,000 tons of sponge iron and 60,000 tons of small bars. The initial phase is estimated to cost \$M16,000,000. Iron ore from the mines in Perak and coal from Sarawak are to be used.

The second stage, to cost an additional \$M36,000,000, is to await the completion of the Cameron Highlands hydro-electric scheme. Electric pig iron smelting furnaces and electric steel furnaces will add to the capacity 120,000 tons of sponge iron, 72,000 tons of pig iron, 120,000 tons of steel ingots and 106,000 tons of small bars and shapes.

Dr. Tetsuo Shimamura, managing director of Yawata, has stated that the taking of iron ore from Perak for the new mill will have no effect on the quantity of the crude ore now being exported by Malaya to Japan, for which purpose the ore to be produced on the east side of the country should prove sufficient. He doubtless had in mind the new Rompin Mining Company Ltd. mine, at Bukit Ibam, which is expected to start production in May 1962.

This mine, which has taken over seven years in exploratory and geological research and construction work, will be one of the largest iron ore mines in South-East Asia. It will employ about 2,000 people, about 80 per cent of them Malays. To get the mine into operation an expenditure of over \$M70,000,000 is involved, to which must be added another \$M20,000,000 for the cost of marine craft.

The mine site is on a 770-ft. hill, to reach which from the coast necessitated a 120-miles hazardous journey up a twisting river. To halve this distance the company is constructing a railway, of which all but the last seven miles is completed. By November there will be a direct rail connection between the mine and its coastal loading terminus. Here the company has built its shipping installation, with a 200-acre stockpile area, port facilities, accommodation, schools and a hospital. The ore transported by rail to the shipping installation will then be loaded on to some 25 ocean-going lighters, each of 300 tons, for conveyance to freighters for Japan four miles off shore. The lighters and eight tugs for use by the stevedoring company have already been built in Hong Kong.

Construction of the railroad has involved building about 200 bridges, totalling 14,000 feet, over streams and swamps. Equipment for building the railway, some from Britain and the United States, has cost about \$M11,000,000. Much of this will later be used in mining. A second-hand 70-ton Malayan Railway locomotive and two 30-tonners are being used in rail laying. The rolling stock for transporting the ore, including





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four 1,000 h.p. Hitachi diesel electric locomotives and ore wagons, have been ordered from Japan.

Output estimates are 1,000,000 tons of high-grade ore in the first year, increasing in later years to 3,000,000 or 4,000,000 tons a year.

The company has been granted by the Pahang Government a 21-years mining lease over 3,000 acres and, in addition, the company holds prospecting rights over 4,000 acres of surrounding land. According to the managing director, Mr. J. N. McHugh, proved reserves in the mining lease area amount to 8,000,000 tons of high grade ore, but 40,000,000 tons are believed to be contained in the Bukit Ibam area.

The Rompin Company is associated with Eastern Mining and Metal Company which operates Malaya's currently largest iron ore mine at Dungun, in Trengganu, with an annual output of around 3,000,000 tons. As the resources of this mine run down the new company expects to absorb many of the Dungun engineers, technicians and artisans.

#### AN IRON AND STEEL INDUSTRY FOR GREECE

The founding of a 250,000 t.p.a. iron and steel industry was recently announced by Mr. Alexander Tsatsos, chairman of the Industrial Development Corporation of Greece. The I.D.C., it was stated, had decided on the immediate establishment of a company, to be known as "Iron and Steel of Greece S.A.", with an initial capital of 250,000,000 drachmas. The announcement added that, since last May, various production processes had been under examination in order to select the one most suitable to economic and technical conditions in Greece. No decision has yet been reached regarding the location of the new industry, which will cover 1,000 acres. Among the sites which have been suggested are Halia in the vicinity of Chalkis in Euboea, Aulis, in Euboea, and Volos.

Extensive exploration is currently in progress to assess all existing iron ore deposits. Investigations so far undertaken by the Greek Institute of Geology and Sub-Surface Research have indicated only 10,000,000 tons of proved and probable iron ore deposits, whereas 35,000,000 tons will be required for the operation of this plant over a 25-year period. A programme of iron prospecting is to be drawn up by a French expert.

Proved and probable beds of iron ore exist in the island of Thasos, off the coast of Macedonia, in Crete and in Serifos, a small island of the Cyclades group. Since the manner in which the iron ore beds in these areas are now being worked is not considered satisfactory, negotiations are proceeding with a view to the prospecting and mining of the beds on a wider scale. The lead in these negotiations has been taken by I.D.C. which, it is stressed, will act as a privately owned enterprise in the matter of procuring iron ore for the operation of the iron and steel industry projected by the corporation. To date, negotiations are being conducted with the firm of Krupp, who own a mine in Thasos, and with the owners of the Serifos mine.

Although the I.D.C. plant may operate on locally mined ore, if necessary, imported iron ore, it is emphasized that the utilisation of purely Greek raw materials will offer the advantage of bringing down domestic prices of iron and steel, because of the absence of high rates of freight, to say nothing of the saving of exchange.

Greek concerns are not displaying willingness to take up shares in the "société anonyme" which I.D.C. is incorporating to operate the iron and steel plant. This must be attributed to the fact that the industry in question will not be able to pay out dividends to its shareholders before the lapse of eight years. This is explained by the fact that the plant is designed to take account of the prospects lying forty years ahead.

However, Mr. Alex. Tsatsos has stated that the Corporation

would be prepared to cede the founding of the iron and steel plant to any foreign firm, provided the terms and conditions were judged to be advantageous to Greek economy.

#### OBSERVATORY FIELD RESEARCH IN CANADA

Over a dozen field parties from the Dominion Observatories of the Department of Mines and Technical Surveys are working in various areas of Canada this summer on a far-reaching programme of mapping the earth's gravity, magnetism, and seismic characteristics.

The programme, announced recently by Mines and Technical Surveys Minister Paul Comtois, complements the year-round geophysical work of the Observatories and is being carried out by five or six parties studying gravity, several parties engaged in seismographic studies, and others that are mapping terrestrial magnetism.

The highlight of the programme is an airborne geomagnetic survey of some 41,000 line miles ranging from the Rockies to central Quebec and from the United States border to the coast of the Arctic Ocean. Also on the programme are an investigation of gravity in areas as widely separated as the Arctic archipelago, the Maritimes, and the Prairie Provinces; and recordings of artificial earth tremors in Ontario and Quebec, as well as on the coast of British Columbia.

The results of these investigations are of great value to prospectors and industry in the search for oil and minerals.

Of the gravity parties, the most northerly are working on the Continental Polar Shelf Project on and around the Queen Elizabeth Islands, as well as on the ice of the Arctic Ocean itself, moving about by helicopter. Another party is measuring gravity on the southern half of Baffin Island, using both helicopters and fixed-wing aircraft in a survey that will last all summer and that forms part of the continuing regional-gravity survey of Canada.

A party using fixed-wing aircraft is surveying gravity in an area stretching some 750 miles from Lake Mistassini in Quebec to the Labrador coast. This investigation is of particular significance because of the noted mineral-bearing potential of the region.

A gravity team is mapping the sedimentary basin of the Prairie Provinces, travelling by automobile through the Winnipeg, Regina, Edmonton, and other areas. This work, which takes in a rich oil-bearing region, is carried out in co-operation with the oil industry.

Another party is carrying out investigations on Hudson Bay, which, scientists hope, will help to solve the question of this great inland sea. The party will take measurements by means of an under-water gravity meter, which will be lowered to the bottom and read by an electronic sensing device on board ship.

In their work on geomagnetism, Observatory scientists are using the three-component airborne magnetometer, developed at the Dominion Observatories, to chart, from an aircraft, the direction and intensity of the earth's magnetic field over that part of Canada lying between the Rocky Mountains and central Quebec, and between the international boundary and 64 deg. northern latitude. These flights are made east to west in a gridiron pattern and provide the magnetic information for all air and marine navigation and topographic maps of Canada, as well as general scientific data about the magnetic field of the earth.

Three field parties are taking magnetic measurements on the ground in British Columbia, the Prairie Provinces, and the Maritimes. These observations during June, July, and August will serve as standard observation points for co-ordinating magnetic airborne surveys. They are necessary to take account of the slow, long-term changes in the earth's magnetic force known as secular change.



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## MAJDANPEK STARTS PRODUCTION

**J**UNE 25, 1961, marked the start of a new era in Yugoslav copper ore mining. On that day, the newly-developed copper mine of Majdanpek, 111 miles south-east of Belgrade, was officially placed in production. This will enable the extraction of copper ore in Yugoslavia to be increased from 2,370,000 tonnes in 1960 to a minimum of 3,600,000 tonnes in the first year of operation.

Half the copper ore mined in Yugoslavia has originated from the well-known mines near Bor, some 25 miles slightly to the south-east of Majdanpek, whose output was equivalent to an average of some 20 per cent of European copper mining production and about 1 per cent of world production. Bor is, of course, not a new venture, activities there having been started in 1906 by a French concern, "Compagnie Francaise des Mines de Bor" (formed in Paris in 1904). Not till after World War II, however, did copper ore mining at Bor achieve its present important position, as shown in the table below:

Copper Ore produced at Bor (in tonnes)

1919	..	..	16,016	1956	..	..	1,741,000
1924	..	..	143,259*	1957	..	..	1,953,000
1930	..	..	493,465	1958	..	..	2,268,000
1939	..	..	984,000	1959	..	..	2,228,000
1946	..	..	646,000	1960	..	..	2,370,000

\* Including 1,848 tonnes from the old Majdanpek mine.

The old sites worked at Bor have been showing a gradually declining copper content, which caused the production of raw copper to contract to an annual average of 30,000 tonnes. Hence the decision taken some years ago to develop production at the Majdanpek mine, where exploitation was actually undertaken during the Turkish era (the word "majdan" is a Turkish term meaning "mine"), but proved uneconomic due to lack of transport. Majdanpek is now the terminus of a standard-gauge railway, the final extension of which was only completed in recent years.

Majdanpek's ore reserves are known to total some 190,000,000 tonnes, while probable reserves have been estimated at 300,000,000 tonnes, sufficient for a minimum of about half a century of production at the extraction rate of 55,000 tonnes envisaged for the current year.

The Majdanpek ore, however, has an average of only 0.7 per cent of copper. Hence exploitation is to be diversified as far as possible by the recovery of other contained metals. Processing will be carried out by the existing plant at Bor. The Majdanpek ore is rich in gold, sulphur and silver, as is that of Bor, the latter containing an average of  $1\frac{1}{2}$ -2 $\frac{1}{2}$  oz. of gold, and  $5\frac{1}{2}$  to 7 oz. of silver per ton of raw copper. Now that Bor will also be processing Majdanpek ore, the production of sulphuric acid is to be increased, and at a later stage, pig iron and steel are also to be produced.

Present plans envisage that the Bor flotation plant will produce an average of 120,000 tonnes of concentrate with 30 per cent Cu content from Majdanpek ore. Further increases in mining and processing, as contemplated in the 1961-1965 Five-Year Plan will enable mining at Majdanpek to be doubled by 1965, and the production of blister and electrolytic copper to be raised to 80,000 tonnes by the same date and to 100,000 tonnes by 1970. In addition, the metallurgical and chemical combine now approaching completion at Bor, Majdanpek and at the Danube port of Prahovo (near the Bulgarian frontier, some 44 miles by road from Majdanpek, and 65 miles by rail from Bor) is to produce more gold, silver and selenium. The gross product of Bor totalled 1,000,000,000 dinar in 1960, compared with 24,000,000,000 dinar in 1959. The present rate of exchange is 2,100 d. to the £. A new sulphuric acid works at Bor, with an initial annual capacity of 230,000 tonnes, is to start production fairly soon. Its output, added to that of the country's other sulphuric

acid plants, will make it unnecessary for Yugoslavia to import any more sulphuric acid. In 1960, Yugoslavia's production of sulphuric acid totalled 130,133 tonnes as compared with 127,720 tonnes in 1959 and 106,662 tonnes in 1956.

In addition to the mines at Bor and Majdanpek, an open-cast site at Lipa (half-way between these two mining centres) is to be exploited in the near future. Between now and 1965 it is also proposed to embark upon the manufacture of germanium dioxide at an initial rate of some 22,000 lb. per annum, and other products will include superphosphate and steel.

Since 1958, when a start was made with the development of the new projects at Bor, Majdanpek and Prahovo, some 30,000,000,000 dinar has been invested including 9,500,000,000 dinar in respect of the extensions at Bor alone. Substantial portions of installations required for developing the mining sites, as well as of the metallurgical and chemical plants, have been supplied by French and Belgian industries.

The magnitude of the work carried out in the Majdanpek area alone between 1958 and 1960 is shown by the fact that the overburden displaced for the open-cast site there totalled 7,000,000 tonnes.

The first Majdanpek open-cast copper ore was delivered to the Bor processing plants by the middle of July last. The lack of railway transport between the two places has been made good by the organisation of road transport making use of high-capacity (30 ton) Euclid tipping trucks.

The new and modern flotation plant at Bor comprises four ore bunkers and four comminution circuits. As to the increase in the blister capacity, additional open-hearth furnaces were placed in service at Bor in June last, while a further unit is to be installed between now and 1965. Two additional anodic ovens, each having a capacity of 200 tonnes per day, for the production of electrolytic copper were placed in service in June last.

So far, the sulphurous gases produced in the metallurgical treatment of the ore have been allowed to escape into the open air, a practice which, besides being wasteful, has caused extensive damage to agriculture and forests in the area. These gases will now be taken advantage of by the new sulphuric acid works, while most of the sulphuric acid is to be absorbed by the fertilizer works (initial capacity 575,000 tonnes p.a.) being erected at Prahovo.

Warm slag with adequate Fe-contents resulting from the metallurgical copper treatment is to be the basic material for the future Bor steel works the initial capacity of which is to amount to 200,000 tonnes of electric steel annually.

Higher requirements of power resulting from the extensions and new works at Bor and Majdanpek are to be met partly by increasing the installed power of the existing Bor thermal power station from 12.5 MW to 22.5 MW, and partly from a new thermal power station being built at Rtanj, some 22 miles south-west of Bor.

The table below reproduces official statistics regarding the production of blister and electrolytic copper at Bor in recent years:

		Blister copper tonnes	Electrolytic copper tonnes
1939	..	41,643	12,463
1946	..	21,730	12,925
1956	..	29,384	25,088
1957	..	33,735	30,128
1958	..	33,672	29,905
1959	..	35,251	31,567
1960	..	35,729	35,053



**Commonwealth Conference—IX**

# Ventilation and Air Conditioning

**N**ATURAL or virgin rock temperatures play a vitally important part in deep-level mine ventilation, because the hotter the surrounding rock the faster, generally speaking, does the air heat up. Fig. 1 shows approximate rock temperature graphs for the main South African gold mining areas.

The large difference in rock temperatures in different mines is accounted for by differences in the thermal conductivity of the overlying rocks. High conductivity overlying strata (e.g., the quartzites of the central Witwatersrand) allow the earth's heat to escape rapidly through the surface crust into the atmosphere. On the other hand, a low conductivity crust (e.g., the sandstone, shales and lavas of the Orange Free State) tends to retard the heat flow from underneath, leading to high rock temperatures below.

Maximum depth reached below surface (ft.)	No. of mines
0 - 1,000	0
1,000 - 2,000	2
2,000 - 3,000	4
3,000 - 4,000	3
4,000 - 5,000	11
5,000 - 6,000	11
6,000 - 7,000	11
7,000 - 8,000	6
8,000 - 9,000	4
9,000 - 10,000	3
10,000 - 11,000	1
11,000 >	1

Total 57

The ranges of depths actually reached in gold mines in South Africa and the rock temperature categories into which the various mines fall are shown in the tables in the form of a frequency distribution because an overall average would be meaningless. The maximum vertical depths and rock temperatures attained in the deepest 10 mines—i.e., "deep" in the rock temperature sense—are shown in the table.

Maximum rock temperature reached (°F.)	No. of mines
< 80	4
80 - 90	12
90 - 100	11
100 - 110	18
110 - 120	10
> 120	2

Total 57

It has been shown in realistically designed experiments that above 87 deg. F. saturated, at 100 f.p.m. velocity, work output drops fairly rapidly, and above 92 deg. F. saturated, at 100 f.p.m. velocity, the drop becomes very great.

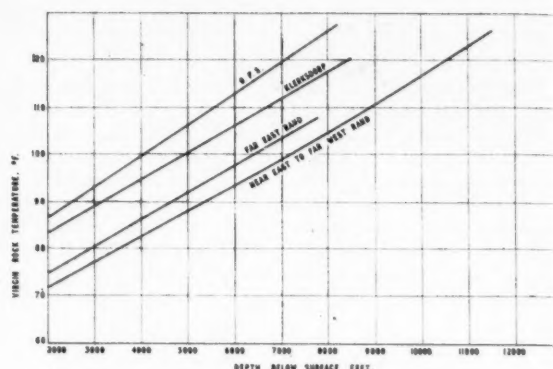


Fig. 1. Approximate rock temperature graphs

In another investigation under run-of-mine conditions in stopes where, however, there was no statistical control of variables, the fall-off in production seemed to occur at a figure as low as 83 deg. F. wet-bulb at 100 f.p.m. velocity.

Ten mines with highest rock temperature			Virgin rock temperature at maximum depth °F.
Maximum depth reached (ft.)	Name of Company	Locality	
11,246	E.R.P.M.	Near East Rand	125
7,435	President Brand	Orange Free State	122
10,450	City Deep	Central Rand	120
9,714	Crown Mines	Central Rand	116
7,332	Vaal Reefs	Klerksdorp	114
8,086	Simmer & Jack	Near East Rand	113
6,450	F.S. Saaiplaas	Orange Free State	113
5,971	Freddies	Orange Free State	111
9,040	Robinson Deep	Central Rand	111
5,780	F.S.G.	Orange Free State	111

Estimate of group ventilation engineer	Maximum wet-bulb °F.	Maximum dry-bulb °F.	Minimum air velocity ft./min.
A	87	—	100
	90	—	250
B	87	95	250
C	87	97	250
D	88	—	100
	90	—	400
E	90	100	400
F	91	100	250
	92	96	800
G	92	96	300
	93	98	800

The aim is to maintain konimeter counts below 200 p.p.c. When counts of over 400 p.p.c. are recorded, immediate investigations are usually instituted into the causes of high dust counts with a view to reducing them. Although our average dust level is probably the lowest in the world (less than 200 p.p.c. above ½ micron or about 0.6 mg/cu meter below 325 sieve size), yet cases of silicosis continue to occur. It must be remembered, however, that the free-silica content of the rock mined is high, viz. 70 to 90 per cent.

by

**M. Barcza**

GROUP VENTILATION ENGINEER, RAND MINES, LIMITED

and

**J. De V. Lambrechts**

GROUP VENTILATION ENGINEER,  
ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED

# Practice in South African Gold Mines — I

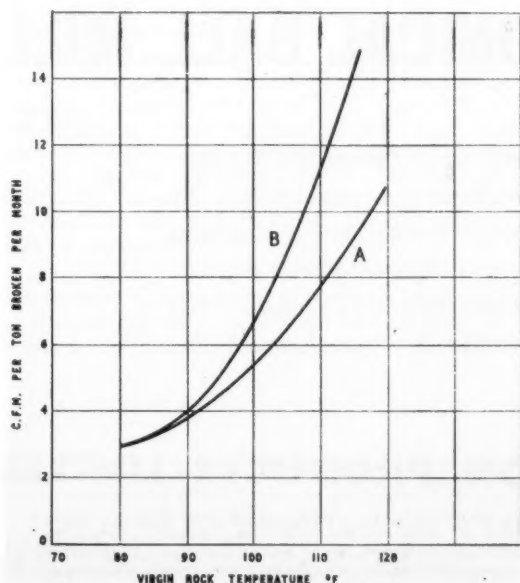
With regard to gases, we conform generally to world standards, dictated by toxicity and explosive hazards. The maintenance of these standards is safeguarded by legislation set down in government regulations. Consequently, with few exceptions, when special precautions are taken, blasting is done only at the end of the shift. These special precautions relate chiefly to development ends where blasting sometimes takes place several times per day. But in these cases special return airways direct to surface are provided for the vitiated air and in a small number of cases, blasting-fume filters are used.

Diesel locomotives have made their appearance underground in large numbers in recent years and must be regarded as a not inconsiderable gas contaminant. There are close on 2,000 diesels in use underground in the gold mines, most commonly between 20 and 40 h.p.

Legislation demands that the quantity of fresh air supplied during the full twenty-four-hour period shall not be less than 30 c.f.m. per person underground. These requirements are exceeding several times and the average volume circulated in 1959 was 127 c.f.m./person.

Ventilation engineers do not regard the c.f.m./person parameter as particularly relevant, but no rational criterion of air quantities has been agreed upon as yet. With our present-day mining methods and mine layouts, the air circulated per ton of rock mined (c.f.m./ton per month or tons of air per ton of rock) has some practical significance and is the most popular yardstick. Others base their planning on a specified air velocity at the stope face and on the length of the stope face which can be ventilated at such velocities, before the wet-bulb reaches a pre-determined upper limit. From the type and degree of air control and from the stoping width, the required downcast volume can then be calculated.

Fig. 2. Approximate air requirements. Legend, Curve A—favourable combination of factors. Curve B—unfavourable combination of factors



The article appearing herewith is condensed from a paper presented at The Seventh Commonwealth Mining and Metallurgical Congress convened in Southern Africa. It is one of a series in which papers of particular interest are offered in abridged form

In shallow mines, air circulation is usually between 2 and 4 c.f.m./ton broken per month. This is no deliberate objective but is probably dictated by years of experience arising mainly from considerations of dust dilution. In the deeper mines, experience has shown that air quantities which are needed for temperature control are also adequate for dust control.

When it comes to making an estimate of air requirements in the deeper mines, there are many factors in addition to rock temperature which vitally affect the issue, such as:

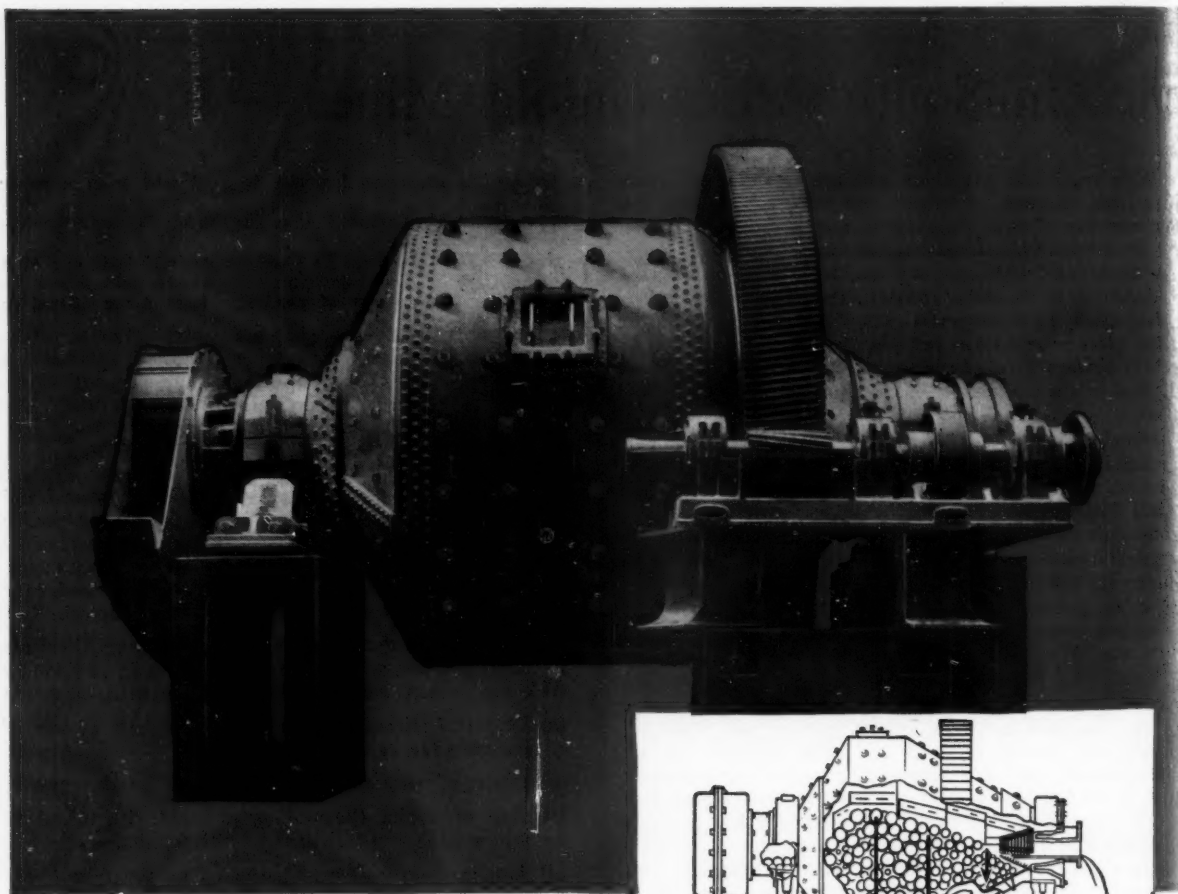
- Degree of mining concentration (particularly by way of increased rate of stope-face advance);
- Degree of water control (particularly in intake airways);
- Type of stoping (longwall or scattered, determined by geological factors such as payability, faulting, etc.);
- Auto-compression heat (depending on the depth/rock-temperature relationship);
- The standard of environment which is deemed "acceptable" (dependent on humanitarian considerations and the efficiency of the human "machine").

Factors (a) and (b) above are probably of more importance than the others. If, for example, stope faces can be advanced faster, this represents better usage of the same air and consequently greater ventilation economy. The norm in stope-face advance within the gold mining industry is at present in the region of only 10 ft. per month, but some mines are achieving 20 ft. and occasionally even 30 ft. per month and are reaping the "ventilation" benefits.

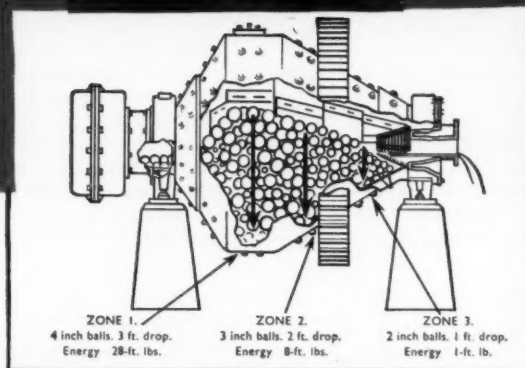
Similarly, a dry intake airway system (shafts, crosscuts, haulages, etc.) leads to a significantly lower heat pick-up and again, ventilation economy. Opinions at present differ in their quantitative appraisal, but there can be no doubt that those mines which practise a system of dry intake airways (either through artificial drying, or being naturally dry) reap the benefit through increased ventilation economies.

One might say that through a favourable or unfavourable combination of the operative factors, the volume of air needed to ventilate a "hot" mine to acceptable standards, varies very considerably and this is shown in Fig. 2. The difference between the upper and lower curves in Fig. 2 may mean the difference between loss and profit, particularly on the lower grade mines and, needless to say, the gold mining industry is striving towards the favourable combination of factors represented by the lower curve, or even better.

It should be clearly understood that Fig. 2 refers to the total downcast air, measured at about sea-level density and includes re-conditioned air from cooling plants where such plants are installed or contemplated.



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## Mount Isa—An Epic of Australian Mining History



Aerial view of Mount Isa mine

622(943-MOUNT ISA)

**A**USTRALIA is the leading producer of mine lead in the Free World, the third largest lead producer, and comes sixth in the list of copper producers. Mount Isa, in North West Queensland, produces more than two-thirds of Australia's copper, one-quarter of its lead and one-third of its silver, besides making valuable contributions to its supplies of zinc. One of the world's great mines, it stands out in the Australian economy as providing far more export income than any other company. But the achievement of Mount Isa cannot be assessed in terms of statistics alone. More notable even than the output figures has been the conquest of adversity; of dry rocky terrain, distance, climate, and the erratic behaviour of lodes.

Situated 1,000 miles from Brisbane and 1,700 miles from Adelaide, Mount Isa is among the most isolated mining undertakings in the world and it is perhaps the only main underground mine in the tropical zone worked entirely by white men. Its nearest deep water port, Townsville, is 600 miles away and its nearest coalfield even more distant. Discovered in 1923, it was worked for eight years before it yielded its first ingot of lead and it was 25 years before the first dividend was paid. Lead was mined at Mount Isa for years before it was discovered that immense amounts of copper lay buried nearby.

The first director of Mount Isa Mines, from 1924-27, was Mr. William H. Corbould, who floated the original company with William McRae, E. E. Fosbery and the Hon. A. M. Bemsley as co-directors.

Few mines have had a more dramatic struggle for survival than Mount Isa—today, Australia's largest individual earner of overseas income—whose story is told in "Mines in the Spinifex", by Geoffrey Blainey (Angus and Robertson Ltd., Sydney and Melbourne, Australia, and London, England, pp. 242, price 27s. 6d.). In drawing upon this fascinating historical record, the opportunity is here taken to present a brief summary of the company's present programme and operations

The original workings were nearly 30 years old before Mount Isa was transformed by one of the most dramatic discoveries in the history of mining. The lead and silver at Mount Isa were unexpectedly poor, the cost of transport by camel and horse and motor lorry drove out prospectors, and the first companies were impoverished. Sudden rushes of water in the mine hastened the fall of a company headed by Mr. Leslie Urquhart which had previously created Russia's greatest mining enterprise. Then low metal prices and Mount Isa's own grave metallurgical problems frustrated the largest smelting company in the world, the giant American Smelting and Refining Company. No mine in Australia absorbed so much capital as did Mount Isa.

By March 1948, the American Smelting and Refining Co., which for 18 years had financed and guided the Mount Isa mine indirectly through the Mining Trust, acquired a more direct control by becoming the main shareholder. Today, it owns 53 per cent of the shares.

After six years of planning and construction, the company began a new era of copper production in 1953 and, after 30 years of uncertainty, the Mount Isa Mines became the largest mining company in Australia.

During this period of swift expansion the reign of the American managers came to an end with the resignation from chairman of the directors of Julius Kruttschnitt, who had come from the U.S. when the underground waters were retarding the mine and repeated calls for money were delaying the start of the mill. For 22 years he had shouldered a great responsibility in the management of the mine affairs. That same year the general manager, Charles R. Hilton also retired. Although the American company retained control, Australians were appointed to manage the mine. George R. Fisher, a director and general manager of Broken Hill's largest mine, Zinc Corporation, succeeded Kruttschnitt as chairman and K. B. Gross succeeded Hilton as general manager, later to become chairman of the company's subsidiary Bowen Consolidated Coal Mines. J. W. Foots is the present general manager.



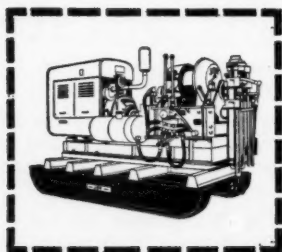
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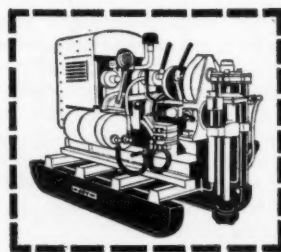


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In 1954, when uranium was discovered near Mount Isa, the value of the company's shares jumped £1,000,000 in one day.

It was at the time when Mary Kathleen, Rum Jungle and other now forgotten uranium mines were firing the imagination that the richest unfound lodes of copper were discovered beneath the township of Mount Isa itself, following an acceleration of the tempo of exploration. First, the problem of what ore was payable had to be determined and this was accompanied by a second problem of finance. The company's revenue in the decade 1948-57 had exceeded £100,000,000 and net profits had exceeded £21,000,000, more than half of which had been ploughed back into the mine. Even so, the undistributed profits alone were insufficient to finance the immense projects and Commonwealth aid was sought in the form of lighter taxation in view of the new development work involved, but this was not forthcoming.

### Problems of Transport and Power

To solve the transport problem, however, the Commonwealth Government finally agreed to lend the State of Queensland £A20,000,000 of the £A30,000,000 needed for the rebuilding of the railway to Townsville, and the Queensland Government in turn agreed to provide the remaining £A10,000,000. Late in 1959 plans went ahead for the largest public works project that tropical Australia has known. The Mount Isa-Townsville railway was originally intended to transport cattle and is too light to carry heavy rolling stock at reasonable speeds. Its reconstruction is therefore vital to the future development of the mine. It might be added that the present revenue to the railways from Mount Isa is over £A3,000,000.

Problems were also presented by the growing demands for water and electrical power. The old Rifle Creek reservoir having become too small for the needs of an expanding tropical industry, a new dam and reservoir were constructed. The Leichhardt Dam, completed early in 1958, is designed to store 1,700,000,000 gallons of water. It also became necessary to provide additional generating capacity, and this was done by the construction of Australia's first outdoor power station. Scheduled to produce power from its first 30 megawatt set in May last year, the Mica Creek power station is now being expanded to 60 megawatts, and it is expected that the additional capacity will be commissioned in 1961.

In four years Mount Isa spent £22,000,000 on capital reconstruction and the flood of spending has yet to ebb. The

A 72 in. folding scraper underground at Mount Isa



Year to June 30	Ore Treated (tons)	Silver (ozs.)	Lead Bullion (tons)	Copper (in dross) (tons)	Zinc (tons)	Copper (blister) (tons)
1960	2,687,586	5,024,381	50,520	786	17,504	40,475
1959	2,278,579	5,023,218	57,035	857	14,423	41,945
1958	1,655,070	4,256,262	50,960	805	18,984	31,165
1957	1,404,813	3,887,851	45,190	898	18,386	28,875

weekly tonnage of ore mined has doubled and the output of copper and lead is soaring, but peak production still lies far in the future.

The mine itself has been revitalised to become Australia's largest underground mine. At the same time another industrial plant has arisen 600 miles to the east to refine the blister copper which had formerly been shipped to refineries in New South Wales and overseas. The electrolytic refinery at Stuart, near Townsville, was brought into production on schedule in June, 1959. Its designed capacity of refining was initially at the rate of 40,000 tons a year but is being expanded to 60,000 tons; it is planned that the expansion will be completed at the same time as that of the copper smelter. A plant for rolling copper rod and drawing wire has also been constructed.

The huge expansion programme has involved raising the tonnage throughput at the mine from 4,000 tons to 14,400 tons per day. This bold scheme, begun in 1956, was planned in two stages. The first envisaged raising mine output to 8,100 tons per day—the maximum tonnage that could be handled by the Townsville-Mount Isa railway. This target was reached in October, 1959. The second stage, which has always been dependent on the rehabilitation of the rail link, involves raising mine production to 14,400 tons per day and is scheduled to be completed by July, 1964.

The actual capital expenditure absorbed during the last two years on new construction and equipment attendant on the expansion programme has been slightly more than £A5,500,000 each year. During the year ended June 30, 1960, expenditure included large commitments for the new power house, plant for the further mechanization of the mine, the completion of the 500 ft. copper smelter stack and structural steel and plant for the copper smelter.

### The Current Year

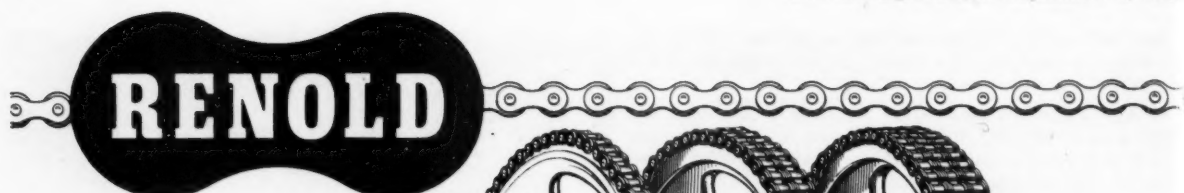
The current year should prove as interesting as it will be rewarding as the new extensions to the copper smelter are scheduled for completion. This will raise the total smelting capacity to a level of 70,000 tons of blister copper per annum and will eliminate the necessity to place copper concentrates for direct shipment. The commissioning of the new copper smelter will complete the first stage of the expansion programme. The key to the completion of the second stage is the sinking and equipping of the new K 57 shaft. The shaft will be 24 ft. in diameter and will be sunk to 3,200 feet.

Both development and exploratory drilling were maintained at a high level in the year to June 1960; in fact the exploratory drilling at 67,135 feet established a new record.

Prospecting and exploratory work outside the Mount Isa area continued on the same scale as last year, mainly on copper prospects. These are located in the Many Peaks area, which include the Glassford Creek, Mount Cannindah and Mount Kroombit prospects; and the Ruddygore prospect in the Chillagoe Authority. Lead-zinc deposits are being examined within the McArthur River authority. Prospecting is also being carried out in the Blue Range district.

At the end of June, 1960, copper ore reserves totalled 24,200,000 tons, averaging 3.7 per cent copper—the same as in the previous year. Silver-lead-zinc ore reserves at the same date totalled 25,600,000 tons containing 5.6 oz. silver, 7.8 per cent lead, and 5.8 per cent zinc. Ore reserves are expected to continue to increase.



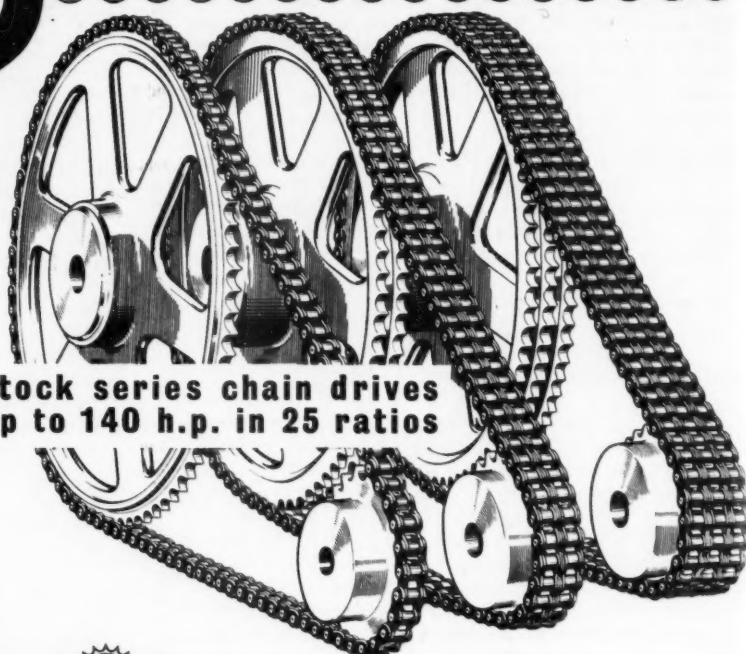


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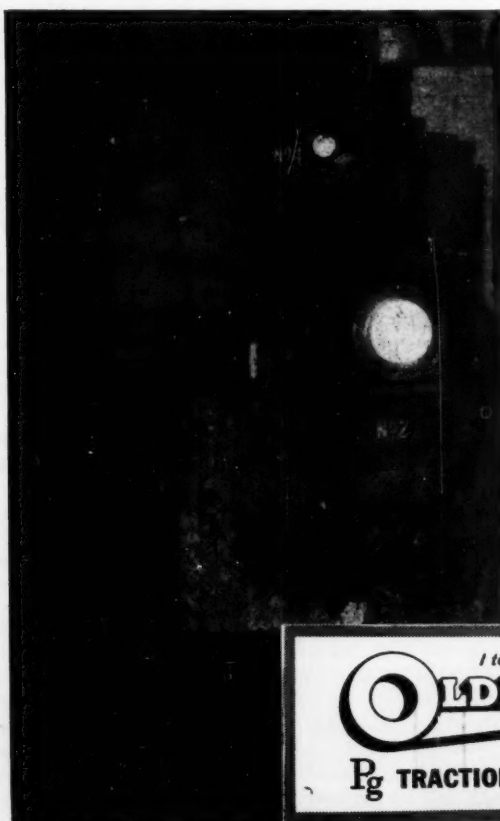
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## Machinery and Equipment

### Testing the Sieve Bend in Fine Screening of Coal

Since the cleaning of fine coal, particularly for metallurgical use is receiving greater attention, the U.S. Bureau of Mines has carried out investigations of the sieve bend for screening effectively at sizes below that normally employed. It was found that the capacity of the screen when operating at peak efficiency varied with the size of the openings and ranged from 100 g.p.m. at 0.3 mm. to 500 g.p.m. at 3.5 mm. Unlike conventional screens, which exhibit a steady decrease in efficiency with increase in load, the efficiency decreases with feed rates that are either higher or lower than the optimum range.

With 0.3 mm. openings, a separation at about 0.2 mm. and with 3.5 mm. openings, a separation at 1.3 mm. is normal. Furthermore the separation depends to some extent upon the size composition of the feed. The presence of a high proportion of particles having about the same size as the screen openings tends to coarsen the separation.

As with conventional screens, the efficiency of the sieve bend depends largely on the size composition of the feed. Higher efficiencies are obtained when the feed contains a large proportion of undersize material than when the percentage is small, whilst the presence of an abnormally high proportion of particles having about the same size as the screen openings mitigates against high efficiency. With the sieve bend, these factors appear to outweigh the size of openings in determining screen efficiency and 70 per cent to 80 per cent appears to be the average for a feed exhibiting an ordinary degree of screening difficulty.

#### NEW WINCH

A new double barrelled geared winch, which has a maximum lifting load capacity of 10 tons and which employs a torque

converter to withstand heavy shock loading, has been introduced by Henry Sykes Ltd. This new winch, the No. 8TC, is an extension to the manufacturer's range of double barrelled winches in which a drop hammer may be operated from the upper barrel, the lower front barrel being employed for heavy loads at low speeds. The use of a torque converter on this winch gives a high degree of flexibility in operation, enabling the load to be manoeuvred at creeping speeds or stalled where required for accurate positioning.

The power unit is a Lister FR6 radiator cooled diesel engine which develops 48 b.h.p. at 1,500 r.p.m. The torque converter is mounted on an extension of the engine shaft and is a British twin disc heavy duty series 1500 single stage unit capable of transmitting up to 650 lb./ft. The converter uses SAE.10W oil. In this unit, the pump is integral and a self-governing circuit is employed. The drive is taken from the torque converter output shaft by means of a composition silent pinion to a double reduction gearing.

The diameter of the piling barrel is 14 in., the effective length of this barrel being 18½ in. The maximum drop hammer load for piling duties is 4½ tons at a working speed of 120 ft. per min. The lifting barrel is 12 in. in dia. and has a length of 31½ in., the maximum design loading for this barrel being 10 tons at a hoisting speed of 60 ft. per min. The winch has an overall length of 9 ft., a width of 7 ft. 6 in. and a height of 6 ft. 4 in. The total weight is 5 tons 7 cwt.

#### A RANGE OF HOSES

Literature from F. Reddaway and Co. Ltd. describes the company's wide range of industrial hoses. The range is impressive indeed, and includes wrapped ply hoses suitable for either suction or delivery and from ¼ in. to 28 in. internal dia. to braided hose up to 500 ft. lengths

of max. 1½ in. inside dia. Armoured hoses as well as several grades of water delivery hoses are included.

Air hoses supplied by the manufacturers include the Armadillo, intended for the severest compressor usage in mines and quarries. Characteristics here are in excess of N.C.B. specification P103-1954. The Armadillo is available in lengths of 60 ft. up to 3 in. dia. In similar vein the C.C.C. provides an economical but high quality pneumatic hose, while the long length moulded air hose first grade is designed for pneumatic tool service where constant contact with oil and oil mist is likely and where pressures are high. Other units complete the company's air hose range.

In all, a wide range of industrial endeavour is included in the Reddaway products, representative items being shot blast hose, acid hose and various suction and suction-discharge hoses.

#### ROD DECKS FOR VIBRATING SCREENS

The Ty-loc rod deck screening surface of straight rods manufactured by International Combustion Products Ltd., is widely used in screening operations for ores known to be difficult to handle, and where close or final sizing is not required. The deck is successfully employed for wet or dry screening the most abrasive materials, and is now giving efficient and continuous service in steelworks, large tonnage milling plants and many other installations.

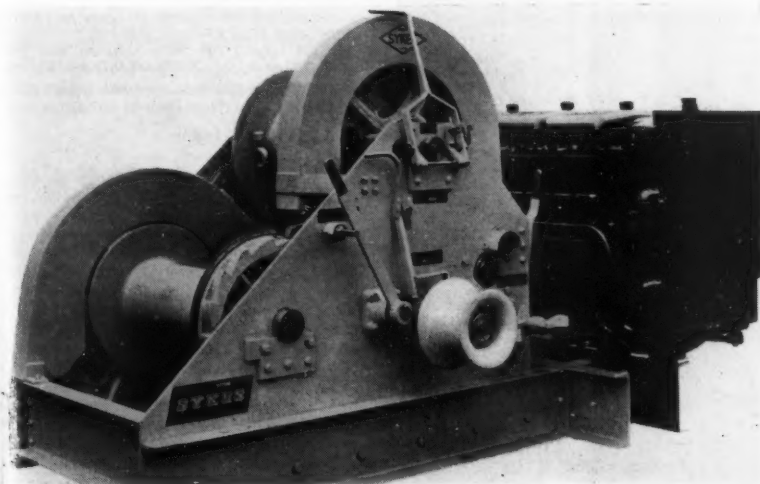
The high tensile steel rods used in the Ty-loc rod deck give maximum resistance to abrasion, ensuring a long working life for the deck under the most severe operating conditions. The slotted openings eliminate plugging when damp materials are being handled. Since worn rods may also be quickly and easily replaced, operating costs are very low.

The Ty-loc rod deck comprises straight uncrimped rods assembled in rubber rod holders to form sections 1 ft. wide and approximately 2 ft. 6 in. long, and is used for separations at ½ in. and above. The rod sections are mounted longitudinally by engaging the rubber rod holder at the discharge end of the assembly between the intermediate clamp bars, and by laying the assembly on the rubber rod spacers so that each rod fits into its groove on the spacers. The feed end of the section is then depressed so that the rubber wedge may be fitted underneath the feed end clamp bar.

The rod holders and spacers ensure that the rods are correctly spaced and the rubber wedge keeps the assembled sections securely in place. Simple leverage tools are supplied which enable unskilled personnel to make quick deck replacements. Since bolts are not used in the construction of the rod sections, they may be mounted or disengaged in a few minutes.

All the elements of the rod deck assembly are provided in one foot widths including the clamp bars. These flat steel bars have alloy hardened surfaces to resist abrasion as the material cascades over the bars onto a succeeding rod section.

The new Henry Sykes 8TC winch



# MINING

## MISCELLANY

Kaiser Steel Corporation has signed a 10-year contract to sell 10,000,000 tons of iron ore to Mitsubishi Shoji Kaisha of Japan. The iron ore will be produced at Kaiser's Eagle Mountain mine in southern California, and shipments are to begin towards the end of 1962 at the rate of 1,000,000 tons annually.

The building of a deep-water terminal for unloading iron ore is under consideration on the River Severn, between Newport and Goldcliff, Mon., sited in Newport Deep. Richard Thomas and Baldwins, below whose Spencer steelworks the terminal would be sited, have applied to the Ministry of Transport for permission to survey the area.

The High Authority of the European Coal and Steel Community has announced that the iron ore mining industry in the six-country area is expected to invest some U.S.\$62,000,000 during 1961, and \$51,000,000 in 1962. Investment in hard-coal mining is expected to be \$457,000,000 and \$363,000,000 for 1961 and 1962. After the latter investment, hard coal production capacity of the ECSC is given as 252,000,000 tonnes.

A New Zealand prospecting party are stated to have found small quantities of gold in mountain streams in the Carstensz Hills area of Dutch New Guinea.

The parliament of the Republic of Mali announces its acceptance of a four-year plan, ending in 1964 and involving the expenditure of 64,100,000,000 CFA-francs from public funds, on economic development. Of this total, a sum of 1,100,000,000 CFA-francs is to be spent in mineral exploration. The Mali government would encourage private companies' aid in such exploration.

The Phelps Dodge Corporation, of the U.S.A., and A. B. Svenska Metallverken of Sweden are planning a new copper production unit to be set up in the Argentine. This would be operated by a new joint subsidiary company, Phelmet. Investment in the scheme is estimated as U.S.\$11,900,000, of which some \$3,400,000 would come from Phelps Dodge. The approval of Argentine is now awaited for the scheme.

Jones and Laughlin Steel Corporation of Pittsburgh, U.S., announce plans to spend \$12,000,000 on facilities for producing lightweight tinplate at their Aliquippa works. The new mill to go into operation next spring, is designed to process electrolytic tinplate into double reduced or "thin" tinplate, which some market analysts expect to form 25 per cent of the entire tinplate market by 1962. Its price is about 15 per cent below that of conventional tinplate, and shipping costs are reduced because of its lightness.

Sierra Leone Ore and Metal Co., a subsidiary of the Swiss firm, Aluminium Industrial A.G., has submitted a draft agreement to the Sierra Leone Government, reports Barclays Bank D.C.O., following the discovery of bauxite in the Mokangi Hills in the Moyamba district last year. A hydrographic survey of the river has started in the Bonthe area, to determine its depth, for the purpose of shipping the bauxite. Trial quantities have been shipped to Germany for washing, to determine the most suitable washing plant to be installed in Sierra Leone, for producing a high grade ore for export.

Details of new industrial development plans were given by Mr. C. J. Hatty, Minister of the Treasury, Southern Rhodesia, in his recent Budget speech. These included a number of projects associated with the mining industry, among those

mentioned being an additional shaft at the Kamativi Tin Mine, part of a 12-month development programme, and a pilot scheme for the production of tantalum concentrates from the pegmatite area in the Mtoko district. The negotiations for the development of the first stage of the Bukwa iron ore deposits continue, and the government is willing to guarantee facilities to the Rhodesian Iron and Steel Co. for part of the capital required for additional blast furnace and coke oven capacity, which the company are considering. The Que Que ferro-chrome project will provide work for an additional 350 Africans and 30 Europeans at the associated Windsor Chrome Mine, and for 75 Africans and 20 technicians at the Que Que plant. (See *The Mining Journal*, July 28, p. 99).

The United Nations is ready to reopen and take over protection of a 230-mile stretch of North Katanga's rail link between Kamina and Albertville, reported a U.N. spokesman in Elisabethville recently. He added that the U.N. had offered its help to the Katanga authorities in reopening the line between Kabongo and Nyunzu, which had been closed for a year.

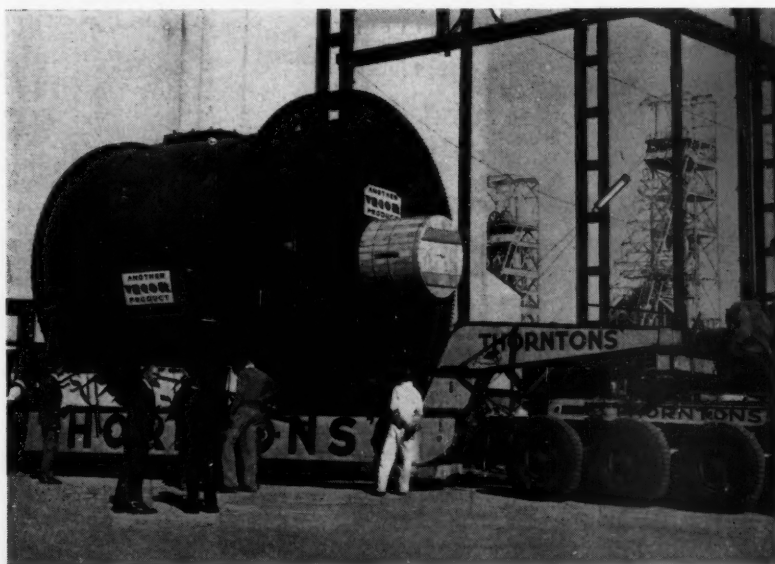
Two Japanese companies, Rasa Trading and Dowa Mining, have acquired an 85 per cent shareholding in a Western Australian copper mining company, the Depuch Shipping and Mining Co. Pty, which has an option over the Whim Well and Mons Cupri mines at Whim Creek, between Roeburne and Port Hedland. Whim Creek mines were big producers until 1919, when a copper slump closed them.

Two Australian uranium companies, United Uranium and South Alligator Uranium, have combined to form a new company, Group Ventures, to open up mineral deposits preferably in the Northern Territory before the current uranium contracts with Britain expire. Potential mineral deposits in other parts of Australia would also be investigated.

Philippine Iron Mines is considering installing an iron ore concentrator at its Larap mine in Camarines Norte, to upgrade the vast reserves of low grade ore there. An engineer of Western-Knapp Engineering Co. of U.S. has just completed a preparatory study. The Atlantic, Gulf and Pacific Co. of Manila manage the mine, and A. Soriano y Cia. are consulting engineers.

The Dutch mining company, Oost-Borneo announce that exploration for bauxite on Misool Island off New Guinea has been abandoned, as results proved negative, and the area under concession has been returned to the Dutch New Guinea administration.

The first of the big tube mills to be manufactured by Vecor for Bracken Mines and Leslie Gold Mines, arrived at Bracken on August 16. Five more tubes will be delivered at monthly intervals and will go alternately to Leslie and Bracken. It will be recalled from the recent chairman's statement that these tube mills are 16 ft. long by 14 ft. in diameter and are believed to be the largest ever installed on a South African gold mine. The total weight of the tube as transported to Bracken was 83 tons and because of the weight and dimensions of the load very close collaboration was necessary between Thorntons, the transport contractors, the Roads Department and—because of the crossings—the South African Railways.





The Philippine government has awarded Consolidated Mines, Inc., a contract for the exploration, development and operation of their Zambales Mineral Reservation, which is almost adjacent to Benguet Consolidated's present chrome operations. Under its present contract with Consolidated Mines, Benguet will work this reservation, where approximately 600,000 tons of refractory chromite reserves have been estimated.

A plant, financed by Non-ferrous Metalworks of Durban, S. Africa, is being built in Petach Tikva, Israel, for the production of ingots and smelting of non-ferrous metals. Raw materials will be imported, except for scrap which was formerly sent abroad for processing. The plant should commence production in the first half of 1962.

The Rhodesian Rhodest Hill Development Co. expects to make substantial progress on its £4,350,000 scheme to install an imperial smelting furnace to lower production costs. This furnace would also improve lead and zinc recovery from about 60 per cent to 85 per cent, and enable the mine to recover about 200,000 tons of lead and zinc from accumulated high grade oxide stocks which cannot now be treated economically. It is expected that the plant will start work early in 1962.

The Kaiser Aluminium Co. has signed an agreement with the Government of Panama to explore Chiriqui Province for bauxite deposits. The U.N. Special Fund is to supply Bs. 2,004,800, and Panama Bs. 1,139,740 for a survey of the country's hydraulic and mineral resources.

The Kuwait government is reported to be considering an agreement with Demag of W. Germany for the establishment of an iron and steel producing factory in Kuwait, using imported iron ore from India (probably Goa) for the production of raw steel, to be exported for final processing elsewhere. Negotiations have also taken place between the Kuwait government and the Reynolds Aluminium Co. of America to set up a factory to produce alumina for export, and for some local processing, using bauxite, probably imported from Australia and India.

Reserves of iron ore in Algeria estimated at 450,000,000 tons are reported from the Gara Djebilet area of the Sahara, with a possible further 200,000,000 tons. Exploitation would require permission to transport the ore through Morocco, or Spanish Rio de Oro. Wolfram has been found in the Laouni area, 230 Kms. south of Taman-rasset, but uranium prospecting in the Hoggar has not had encouraging results.

During 1961 it is proposed to spend one quarter of Hungary's national income on investments, and 317 construction works are scheduled for completion during this year. The Rudabanya ore-refining mill is to start operations; a new plant at the base of the Matra Mountains will begin exploiting the Ecsed lignite sites, where the most highly-mechanized opencast mine in the country is being worked. The construction work of the Ajka power plant and the Pecs thermal power plant will also be completed this year, while work on the Ozd steel works should be nearly finished.

India Carbon Ltd. are building a plant at Gauhati, to manufacture calcined petroleum coke and anthracite coal. The plant, which will have an annual capacity of 60,000 tons, is expected to go into operation by September 1962. Great Lakes Carbon Corporation of the U.S. is collaborating with the work, and will be represented on the board of this new company. The aluminium industry consumes 44 tons of calcined petroleum coke for every 100 tons of ingot production.

A report from Barclays Bank D.C.O. states that Magnet Consolidated Mines of Toronto is seeking permission to mine bauxite in Jamaica, and the application is under consideration by the Ministry of Development.

The Dominican Republic government is to give further aid to the country's salt and gypsum industry. The firm, Sal y Yeso, plans to export 600,000 tons of gypsum annually.

Manila Mining Corporation reports a new gold strike at its Agusan property on Mindanao, Philippines, where a tunnel at the eastern edge of the gold area has cut 2ft. 6 in. of high grade ore containing 5.5 oz. in gold per ton. Further crosscuts are being driven to find out the extent of this discovery.

The Japanese news agency Jiji reports that a basic agreement has been concluded by Sumitomo Metal Mining Co. of Japan with Indonesia on the development of nickel resources in Celebes.

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## Metals and Minerals

## Aluminium Limited Suspends Boké Project

An announcement by Aluminium Ltd., states that work on the Boké project in the Republic of Guinea is being suspended because of the company's inability to solve the problems of long-term finance. The cost of this project, including such ancillary undertakings as the construction of a port and railway, was estimated at £75,000,000.

Bauxites du Midi, the French subsidiary of Aluminium Ltd., started work on the project in 1957 with a view to the production of bauxite and alumina for export. Bauxite reserves in the Boké region have been stated to comprise at least 422,000,000 tonnes averaging not less than 55 per cent alumina and 1-1.5 per cent silica. Because of the magnitude and complexity of the undertaking, an exceptional combination of strength and resources was required. In February, 1960, it was announced in Paris that Aluminium Limited had started negotiations with other major producers for interim financing, while determining whether long-term financing could be arranged.

No indication is given in the announcement as to the reasons for the present financial impasse. Having regard to the very large number of major developments for the production of alumina and/or primary metal in progress or pending throughout the world, with more than a few of which Aluminium Limited is itself associated, it would not be surprising if, for the time being at any rate, new capital needs were tending to outrun supply. And, of course, the financial climate in Guinea will not have been improved by the political situation.

It may well be that the setback will only

be a temporary one, for the statement adds that the participants will continue to exert every effort to enable work to be resumed. Moreover, President Touré inspired no doubt by the determination shown by his friend, Dr. Nkrumah, in connection with Ghana's Volta project, is sure to do everything in his power to put Boké on the aluminium map.

To quote from the report of Aluminium Limited for 1959: "The bauxite reserves available to the company under a long-term convention signed with the Guinea government are vast in extent and will be of major importance to the world aluminium industry for decades to come". It can be taken as a virtual certainty, therefore, that more will be heard of the Boké project in due course.

## ALUMINIUM IN THE U.K.

Indicative of the competitive conditions and reduced activity in the U.K. are the statistics for Jan.-June, 1961, which show that production of primary aluminium fell to 15,330 l. tons as compared with 16,569 tons in the corresponding period of last year, imports to 123,183 tons from 180,778 tons, and despatches to consumers to 152,142 tons from 200,324 tons. Having regard to the effects of the credit squeeze, it may well be that the July and August returns will be still less encouraging.

A feature of U.K. aluminium imports has been the continued decline in the intake of Russian metal, despite the very attractive price at which it is available. Merchants

present ideas are in the region of £170-£173 per l. ton delivered consumers' works, compared with around £180 nearly a year ago. Throughout this period the Canadian price has remained unchanged at £186 delivered. In 1960, U.K. imports of Russian metal totalled 3,685 tons, in the first quarter of this year 1,353 tons, and in the second quarter 850 tons, according to the British Bureau of Non-ferrous Metal Statistics. In the three years preceding 1960 imports twice topped 15,000 tons. The near elimination of imports from countries other than Canada, Norway and the U.S. stems doubtless from the tie-ups between major North American producers of primary metal and major consuming interests in the U.K.

According to the latest weekly report of the United Business Service, demand for aluminium in the U.S. is expected to turn strong later this year and the longer term outlook remains bright. While industry profits are still suffering from over-capacity, excess producer inventories are being reduced and both monthly production and shipments are up from the low points reached earlier in 1961. The increase in demand resulted in a substantial improvement in second quarter earnings of leading aluminium producers. Output currently is running at about 80 per cent of capacity compared with 65 per cent in the first quarter of 1961.

According to U.B.S., the combination of excess capacity, keen competition among major producers and many secondary sources, and rising labour and operating costs, will keep a squeeze on profit margins. Any increase in the current 26c. a lb. price for primary metal is thus unlikely until supply-demand conditions improve further.

A new bauxite mining company is to be set up in Surinam by Olin Mathieson Corporation, of the U.S. It is understood that the company will exploit deposits in the Bakhuis Hills, which are believed to contain immense quantities of ore. Bakhuis Mining has already applied for concessions in the Nickerie district in the west of Surinam.

## NEW LONDON GOLD RUSH UNLIKELY

Several factors have combined to send the price of gold in the London market up to its highest level since it was stabilised after last year's flare up when the price soared to \$40 an ounce, nearly \$5 above the official parity. First, there has been renewed speculation about the possibility of an increase in the world official price mainly because it is believed that European countries are offering more resistance than was expected to ambitious I.M.F. schemes for resolving the shortage of international liquidity; secondly, because of the hotting up of the cold war and finally because of the approach of the annual meeting of the I.M.F.

In spite of these grounds for speculation and rumours of one sort or another, the fact remains that with last year's experience behind them London and Washington are certain to reintroduce the bridging operation if the price of gold in London should edge too far away from the official \$35 parity.

Furthermore, there is no reason to suppose that European central bankers will discontinue their gentlemen's agreement not to operate in the London market once the price has risen beyond the \$35.25 level.

## LONDON METAL AND ORE PRICES, AUGUST 31, 1961

## METAL PRICES

Aluminium, 99.5%, £186 per ton	Magnesium, 2s. 2½d./2s. 3d. lb.
Antimony—	Manganese Metal (96%/98%) £275/£285
English (99%) delivered, 10 cwt. and over £230 per ton	Nickel, 99.5% (home trade) £660 per ton
Arsenic, £400 per ton	Osmium, £17/£22 oz. nom.
Bismuth (min. 1 ton lots) 16s. lb. nom.	Osmiridium, nom.
Cadmium 1½s. 0d. lb.	Palladium, imported, £8 12s. 6d.
Cerium (99%) net, £15 0s. lb. delivered U.K.	Platinum U.K. and Empire Refined £30 5s.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.	Imported £27 7s. 6d./£27 17s. 6d.
Cobalt, 12s. lb.	Quicksilver, £63 ex-warehouse
Cerium, 99.99%, Ge. kilo lots 2s. 5d. per gram	Rhodium, £43/£45 oz.
Gold, 250s. 9½d.	Ruthenium, £14/£16 oz. nom.
Iridium, £20/£23 oz. nom.	Selenium, 46s. 6d. per lb.
Lanthanum (98%/99%) 15s. per gram	Silver, 79½d. f. oz. spot and 80½d. f.d.
	Tellurium, 37s. 6d. lb.

## ORES AND OXIDES

Antimony Ore (60%) basis .. .. .	30s. 0d./33s. 0d. per unit c.i.f.
Beryl (min. 10 per cent BeO) .. .. .	270s./275s. per l. ton unit BeO
Bismuth .. .. .	65% 8s. 6d. lb. c.i.f.
	18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable 48%) (Ratio 3 : 1) .. .. .	£15 5s. 0d. per ton c.i.f.
" Hard Lumpy 45% .. .. . (Ratio 3 : 1)	£15 10s. 0d. per ton c.i.f.
" Refractory 40% .. .. .	£11 0s. 0d. per ton c.i.f.
" Smalls 44% .. .. . (Ratio 3 : 1)	£13 5s. 0d. per ton c.i.f.
Pakistan 48% .. .. . (Ratio 3 : 1)	£11 15s. 0d. per ton f.o.b.
Aluminate, Nigerian quality, basis 70% combined pentoxides (Ratio 10:1)	
	Nb <sub>2</sub> O <sub>5</sub> : Ta <sub>2</sub> O <sub>5</sub> 150s./160s. 0d. per l. ton c.i.f.
Ithium Ore—	
Petalite min. 3½% Li <sub>2</sub> O .. .. .	50s. 0d./55s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li <sub>2</sub> O .. .. .	76s. 0d./80s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li <sub>2</sub> O .. .. .	75s. 0d./85s. 0d. per ton f.o.b. Beira
agnesite, ground calcined .. .. .	£28 0s./£30 0s. d/d
agnesite Raw (ground) .. .. .	£21 0s./£23 0s. d/d
Manganese Ore Indian—	
Europe (46% 48%) basis 60s. 0d. freight .. .. .	73d./75d. c.i.f. nom.
Manganese Ore (43% 45%) .. .. .	69d./71d. c.i.f. nom.
Manganese Ore (38% 40%) .. .. .	nom.
polybenite (85%) basis .. .. .	10s. 0d. per lb. (f.o.b.)
Tanium Ore—	
Rutile Australian 95/97% TiO <sub>2</sub> (prompt delivery) .. .. .	£25 0s. per ton c.i.f.
Ilmenite Malayan 50/52% TiO <sub>2</sub> .. .. .	£11 10s. per ton c.i.f.
Ilmenite Travancore 58/60% TiO <sub>2</sub> .. .. .	£15/£15 10s. per ton c.i.f.
Vanadium—	
Fused oxide 95% V <sub>2</sub> O <sub>5</sub> .. .. .	126s. 0d./129s. 0d. per unit c.i.f.
Zircon Sand (Australian) 65-66% ZrO <sub>2</sub> .. .. .	7s. 6d./8s. per lb. V <sub>2</sub> O <sub>5</sub> c.i.f.
	£16 ton c.i.f.



### U.K. QUICKSILVER MARKET

The London quicksilver market has remained steady over the past three or four weeks, despite the quietness of demand, because of seasonal influences both here and on the Continent. While some price shading cannot be ruled out from time to time, the general price level is still indicated at £63 per flask, ex-warehouse London.

It is understood that Spain and Italy are not prepared to meet the present competition, possibly on the assumption that the quantities involved at the moment are not large. But the outlook is rather obscure as much depends on how much Russian and Chinese metal will be arriving over the rest of the year. It is understood that some Chinese supplies will be arriving in about three months time, while further imports of Russian are possible.

### CANADIAN POTASH

United States Borax & Chemical Corporation, the American operating company of Borax (Holdings) Ltd., has entered into a joint venture with Homestake Mining Co., of San Francisco, to complete studies relating to possible potash production in Saskatchewan, Canada, where U.S. Borax has been investigating permits held since 1957. U.S. Borax, with mines at Carlsbad, New Mexico, is today the second largest producer of potash in the U.S. Homestake

Mining has had extensive experience in gold and uranium mining.

If the completed studies indicate the technical and economic feasibility of a large Canadian potash operation, the two companies may participate equally in any company formed for such purpose. One or more additional associates may also be invited to participate in the future.

### NICKEL POWDER IN E. GERMANY

A research team from the East German metallurgical combine of VEB Elektrochemisches Kombinat Bitterfeld is reported to have developed a new process for the production of pure nickel powder. The nickel concerned is said to have a high degree of purity. The Bitterfeld combine will in future be able to supply the complete demand of the German Soviet zone.

### TURKISH FERRO-CHROME PLANT

It is believed in trade circles in Istanbul that the ferro-chrome plant being built on the southern coast of Turkey will start operations at the beginning of next year.

The plant is being set up by the French firm Péchiney (Compagnie de Produits Chimiques et Electrometallurgiques) in co-operation with the Eti Bank, which represents State-controlled mines.

## Copper • Tin • Lead • Zinc

(From Our London Metal Exchange Correspondent)

During the last week the highlight of the markets has again been tin with a rise of almost £30 a ton at one moment. The copper market has confounded the prophets and remained relatively steady in spite of a number of bullish factors. Both the lead and zinc markets have developed a better undertone, although the movement in the latter does not appear to be based on any sound reasoning.

### COPPER ONLY SLIGHTLY HIGHER

With the strike at Kennecott's Utah Refinery not being settled as expected last weekend, and with little progress being made in the negotiations for a settlement of the strike situation in Chile, it was to be expected that the copper price would rise steadily and that this movement would be helped by the unrest in Rhodesia and the Congo: actually, however, prices have only risen very slightly and in some quarters this has been taken to underline the weakness of the copper position, but among the more optimistically minded the slowness in the reaction to the strikes is due to the holiday season not yet being over.

Demand for copper in Europe and in Japan continues at a satisfactory rate and the wirebar premium in the former country has now increased to £12/£14 per ton with very little metal on offer; should this tendency continue it may become possible for some of the fire refined copper held in L.M.E. warehouses to be shipped to the Continent for conversion and any such move is likely to result in an immediate improvement in the price level. The contango on the London market remains around 60s. a ton although local conditions forced it to over 70s. a ton for one day during the period under review. Stocks in official warehouses fell by 50 tons to a total of 21,789 tons and it must be remarked that this is the first decrease in the stocks for

many weeks. In America demand is still reported as good and the amount of metal still available for September delivery is small. If the strikes continue much beyond the beginning of next week the majority of dealers expect a sharp increase in the price level.

### TIN NEARING £1,000

The upward movement in the tin market reported last week continued in both London and Singapore and on Tuesday the c.i.f. Europe price of Straits Tin was over £1,000 per ton and forward metal changed hands at £997 per ton on the London Metal Exchange. These levels attracted profit taking, but this did not have the large effect which some had expected and with the base of the market now more firmly established, a price rise through the £1,000 per ton mark is confidently expected. Stocks in official warehouses continue to fall and last week the total was reduced by a further 218 tons to 5,701 tons. The Malayan mining statistics show that 5,170 tons of contained tin metal were produced in July as opposed to the June figure of 4,807 tons. It is interesting to note that there was a considerable increase in the number of gravel pump mines during July and that the total of active tin mines of all descriptions rose from 638 at the beginning of the month to 658 at the end of the month. The Eastern price on Wednesday was equivalent to £983½ per ton c.i.f. Europe.

### BETTER TIMES IN SIGHT FOR LEAD?

As predicted in last week's issue the news that a barter deal in lead had been entered into between the U.S. Government and the Australian mining companies was followed by a similar announcement in respect of an agreement with the Canadian producers.

The tonnage of the Australian agreement was for 45,000 short tons and that for the Canadian agreement 55,000 s. tons. In both cases the delivery of lead is to extend over 12 months and it is to be assumed that both countries' producers have agreed to continue the existing 10 per cent cut-back until the end of the year. These deals, which have been under negotiation since May, removed about half of the producers' stocks from the world market and thereby helped the statistical situation.

It should be remembered that at the last meeting of the statistical committee it was indicated that for 1961 there was likely to be an excess of consumption over production of about 2 per cent, but it seems likely that this may prove to have been an optimistic estimate in view of the recession in the motor industries of the Western World. It, however, a real effort is made to maintain and enforce a 10 per cent cut-back for the rest of the year, it may be that producers' stocks may have begun to decline by the beginning of 1962.

The slightly more optimistic outlook has been responsible for raising the lead price from the very low level reached in recent weeks and although no spectacular advance is expected, a slow and steady rise seems likely. The production of lead in the O.E.E.C. countries amounted to 66,036 tonnes in July as compared with 71,703 tonnes in June, but in spite of this stocks rose to 61,231 tonnes at the end of July as compared with 57,418 tonnes at the beginning of the month. The contango on the London market remained about 30s. per ton in spite of a rise in the stocks of 450 tons to a total of 10,408 tons.

### CAN ZINC HOLD ITS RISE?

The zinc market has also risen from the low levels reached last week, but in view of the known supplies of Russian metal, which is being offered to consumers in the U.K. and in Europe at extremely cheap prices, the rise may prove to be temporary. The contango remains at about 20s. a ton and stocks fell by 210 tons to a total of 6,801 tons. The O.E.E.C. production for July totalled 80,055 tonnes as compared with 80,306 tonnes in June and stocks showed a considerable increase at the end of July at 72,183 tonnes as compared with 59,737 tonnes at the beginning of the month.

### OFFICIAL TURNOVERS

Official turnovers (in l. tons) for the week ending August 25, with the previous week's figures in parentheses are:

Copper	16,550 (12,350)
Tin	1,835 (2,255)
Lead	10,175 (4,625)
Zinc	5,425 (4,325)

Closing prices are as follows:

	August 24		August 31	
	Buyers	Sellers	Buyers	Sellers
<b>COPPER</b>				
Cash	£229½	£229½	£232½	£232½
Three months	£233½	£233½	£235½	£236½
Settlement	£229½		£232½	
<b>LEAD</b>				
Current ½ month	£64½	£64½	£64½	£65½
Three months	£66½	£66½	£66½	£66½
<b>TIN</b>				
Cash	£960	£961	£982	£983
Three months	£968½	£969½	£985	£986
Settlement	£961		£983	
<b>ZINC</b>				
Current ½ month	£74½	£74½	£76½	£76½
Three months	£75½	£75½	£76½	£76½

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**COMING EVENTS**

The Metallurgy Department of the Battersea College of Technology is holding a Summer School on Corrosion, organized with the co-operation of the Corrosion Group of the Society of Chemical Industry. This postgraduate lecture course will run from September 25 to 28, and will be concerned with corrosion problems in the electrical power industry. Further information may be obtained from the Secretary of the Metallurgy Department at Battersea College.

★

Two exhibitions are being staged in Cardiff and Manchester at which modern laboratory equipment will be shown. They will be held in the Welsh College of Advanced Technology, Cathays Park, Cardiff, from September 12-14, and at the Chorlton Town Hall, Manchester, from September 18-21. (Both dates inclusive.) Enquiries should be sent to

Griffin and George's Regional Service Centres either at Birmingham or Manchester.

★

The Institute of Metals is holding a three-day International Conference on "The Metallurgy of Beryllium" in London on October 16, 17, and 18, 1961, to publish and discuss hitherto unpublished original work on beryllium and to cover metal fabrication, physical and mechanical properties, and metal physics. The Conference will be organized by the Institute's Nuclear Energy Committee.

★

The Electrical Development Association will have a stand at the Heating, Ventilation and Air Conditioning Exhibition which will be held at Olympia, London, from September 26 to October 6, 1961.



## Mining Finance

## San Francisco Mexicanises

A new word is fast becoming familiar in the mining scene. It is Mexicanisation. It has arisen to describe a process which the mining companies in Mexico are virtually being forced to adopt in order to remain in economic operation there. As Mr. R. H. MacWilliam, the chairman of San Francisco Mines of Mexico, has said, over the years it has become apparent that so long as the major mining companies were incorporated outside Mexico and were almost wholly foreign owned, then there was no hope of any relief from the crushing burden of Mexican taxation.

Now, however, Mexico has brought about legislative changes which aim at giving considerable relief in this respect if the companies change their status by becoming Mexican controlled. This means that at least 51 per cent of the voting strength must be in the hands of Mexican nationals. The benefit to be gained amounts to a net reduction of about 37½ per cent in production and export taxes, although the increased profits resulting from this concession would still be subject to Mexican income taxes. The concessions have, of course, been made in order to provide the incentive for Mexicans to make the investment in the mining industry there that is necessary for the Mexicanisation of the hitherto foreign-owned companies to be brought about.

At an extraordinary meeting of San Francisco Mines of Mexico held in London on August 24 stockholders unanimously approved the steps taken by this company to Mexicanise itself. It is a complicated scheme, the net result of which will be to leave Friscos with the following assets: its

lead stock, all the concentrates having been disposed of; its remaining cash; 49 per cent of the capital of the Mexican subsidiary Minera Frisco, S.A.; the net cash proceeds (£1,220,000 before tax) of the sale to Mexicans of the other 51 per cent; and an amount owing by Minera Frisco of £3,485,000 of which £3,085,000 will be represented by notes repayable by ten equal annual instalments and the balance by a loan from the parent company to the subsidiary. The cash proceeds will be taxable and will probably involve an immediate Mexican tax payment of some £370,000.

The repayment instalments by Minera Frisco to the London companies are subject to the former earning in each year sufficient to pay a dividend of 10½ per cent on its shares. Of this total of some £251,000 San Francisco will, of course, get 49 per cent, or about £123,000. If the earnings are insufficient then debt instalments will be deferred. Only if the mine becomes exhausted before the whole of the debt is redeemed is any outstanding balance to be cancelled. This clause naturally brought questions from stockholders at the meeting about the life prospects for the mine. The chairman contented himself with saying that exhaustion of the mine before the complete debt expungement looked to be "a remote contingency".

Mr. MacWilliam went on to say that in present circumstances the Board believed that, given the promised tax reliefs, the operating company "should be well able to pay the prescribed minimum dividend each year and redeem a tenth of its debt even on the basis of the depressed metal

prices at present ruling". If the deal goes through on time, that is by today, September 1, then it is hoped that some distribution will be possible to Frisco's stockholders by the end of 1961. Current pre-Mexicanisation operations are not profitable, however, and there will be no dividend for the year to September 30, 1961, against 15 per cent for 1959-60. The 10s. units are 18s. 9d.

On the face of it the deal looks to be a reasonable one in the circumstances, but the price of Friscos is likely to continue to carry in it a large contingency element against the risk that whatever the good intentions of the present Mexican authorities may be the terms of the transaction (especially the tax concessions) may at some future date be altered or even unfulfilled. However, for the time being holders may well decide to sit tight in the hope that anyway the immediate terms of the deal will be borne out and that the company will thereby be able to return to the dividend list on a scale that will at least justify the present share value.

## MAZAPIL'S MISFORTUNES

Another London-based mining company operating in Mexico, Mazapil Copper, likewise faces Mexicanisation, but in this case there is also another problem, namely, that in the present sad state of its operations it will be difficult to secure Mexican participation on reasonable terms if, indeed, at all. A group loss for 1960 of some £125,000 has just been announced. Moreover, there have been further "heavy losses" during the current year. Mazapil's troubles are largely technical. The main orebody at Cata Arroyo has collapsed. A scheme to extract the high-grade oxides from the upper levels of the mine by a panel caving method has failed because of excessive dilution by valueless rock with the result that it has been found impossible to feed the smelter and mill with ore of economic grade.

The Board still believes that the mineral resources within the company's concessions have not yet been exhausted, but new finance will be needed if exploration and mining operations are to be continued. Negotiations for Mexican participation are being started but Mazapil, with only one dividend to its credit over the past decade, can hardly expect to reap much benefit therefrom even if a deal can, in fact, be made. The £1 units have dropped to 2s. 6d. which values the whole undertaking at only £75,000. At this level hold on and hope for the best looks to be the only possible advice.

## BERALT DOES WELL — OUTLOOK FAIR

The statement by the Board of Beralt Tin and Wolfram with the unchanged interim dividend in March concerning profit prospects for the year that ended in that month meant that the actual results now published contained no surprise in being not a great deal different from those for 1959-60. The profit after Portuguese taxation comes out at £241,067 which is £28,203 higher than in the preceding year, a movement that is comparatively small for this producer of Portuguese ore which tends to undergo wide fluctuations in its fortunes in accordance with the gyrations of the wolfram price.

U.K. tax takes a little more on this occasion at £88,937 leaving the net surplus £24,681 up at £152,130. The unchanged distribution, brought up to 60 per cent on the 5s. units with a final of 40 per cent,

## London Market Highlights

An interesting facet of mining share markets this week was the surprisingly small response in tin share prices to the strength of the commodity. A few modest gains were seen on Monday and buying interest became more widespread on Tuesday. But when Singapore enthusiasm waned with a reaction in the metal price on Wednesday, local profit-takers had the field to themselves and a general setback in share prices was the result.

Ayer Hitam, for example, topped 2s. 6d. to 55s. 6d. to show a net loss on the three days of 1s. 6d. Sungei Besi fared no better reacting from 53s. to 51s., but Tronoh, which came back from 77s. 6d. to 75s. 6d., still showed a rise on the week of 1s. The Cornish producer Geevor, which had come to life earlier with a rise of 2s. to 30s., reacted later to 29s.

South African gold share business remained as quiet as ever, but it was encouraging to note that prices were tending to edge ahead. The market was given a fillip by news of Winkelhaak's high-value borehole and these shares jumped 1s. 6d. to 20s. Free State Geduld attracted a little interest and improved 1s. to 80s. 7½d. and a scattering of speculative inquiries made for firmness in Welkom (12s. 3d.) and Free State aaplaas (4s.). New Kleinfontein rose 6d. to 4s. 6d. on the capital return news.

The finance issues which had been dormant also brightened when investment buyers reappeared on Wednesday. Union Corporation gained 1s. to 48s. 6d. and there were rises of 9d. in Gold Fields at 50s. 6d.

and in Central Mining at 34s. 6d.

Rhodesian issues stayed overshadowed by the political upsets in Northern Rhodesia. There was little selling apart from a few Continental offerings, but it was sufficient to lower share prices by 1s. or so. On Wednesday, however, the market began to take a more hopeful view of things and as a result Nchanga soon recouped 9d. to 44s. 9d. and other modest improvements included Chartered (59s.) and Rhokana (45s. 3d.). Publication of the London and Rhodesian plans for expansion explained the previous week's rather mysterious revival of buying and the shares improved afresh to 8s. 1½d.

Less happy was the market in Congo issues. The United Nations operation in Katanga and the implications of a Katanga army bereft of white officers caused Union Minière to weaken sharply on the Brussels Bourse. In London "Tanks" dropped 1s. to a new low of 20s.

The report of St. John d'el Rey contains encouraging news of negotiations for the sale of the Brazilian mine's potential iron ore production, but the political upheaval in Brazil depressed the shares by 6s. 3d. to 92s. 6d. A circular explaining the sorry financial plight of Mazapil was followed by a setback of 1s. to 2s. 6d. in these shares and Mount Lyell at 6s. were also unhappy following the disappointing results. On a more cheerful note, Consolidated Zinc at last attracted some investment demand after their recent idleness and the share price jumped 1s. 6d. to 68s.

absorbs a net amount of £121,643 and the opportunity has been taken to put £46,736 to the reserve for the replacement of fixed assets, acquisition and equipment of new properties, etc. This more than offsets the £21,794 that has been transferred from this reserve for Portuguese expenditure in the past year. The carry-forward is down from £94,996 to £78,747.

A number of factors will have been operating to affect these 1960-61 results. Their respective importance will have to await the annual report in October for assessment. Firstly, according to the monthly returns, wolfram production rose by 193 tons to 2,079 tons of concentrates whereas, in line with the Board's comments last year, tin output fell sharply from 241 tons to only 53 tons.

Secondly, Beralit should have got a better price for its wolfram. The average for 1958-59 was only 82s. per long ton unit. There was an improvement to 125s. 4d. in 1959-60. In the past year the average is quite likely to have been around 140s. or more. The current price is 128s., having eased by a shilling or two during the past fortnight. The Beralit Board comment that this is "an unsatisfactory level" and if it persists then "it will affect profits for the current year". The late chairman, Mr. F. Gates, expressed the opinion last October that a market price fluctuating between 150s. and 200s. per unit would suit the company well, enabling it to continue with a steady production of high-grade concentrates at a cost which would yield a satisfactory profit. This range would also not be high enough to encourage too much of a rush in the re-opening of high-cost mines in other parts of the world.

The third factor in Beralit's profits picture for the past year will have been that of costs, which will have had to bear a higher wage scale that was introduced in August, 1960, and also increased expenditure on development. The hope has been officially expressed, however, that greater productivity together with further mechanisation would enable any serious advance in wolfram costs per ton as a result of these influences to be avoided.

In the current financial year wolfram production has been keeping up well, having totalled 693 tons for the first four months thereof. Tin output remains small at 3 tons of concentrates a month. Beralit units stand at 27s. 3d. cum dividend to yield 11.5 per cent. A generous return is usually looked for on these shares because of the unpredictability of the market for wolfram, which is the ore from which comes tungsten. The recovering U.S. economy should be a helpful factor in sustaining this market. And Beralit's exceptionally strong financial position should also be borne in mind in assessing the prospects for the shares. It enabled, for instance, a distribution of 20 per cent to be made for 1958-59 although the company actually made a net loss for that period.

#### THE IPOH BATTLE CONTINUES

Mr. Ellerton Binns' riposte to Mr. Barney Pike's attempt to remove him and two fellow directors, Mr. W. J. Wilcoxon and Mr. E. H. Fenson, from the Board of Ipoh Tin Dredging is to state that the majority of the directors favour an early capital return of, say, 7s. per 8s. share together with selective working of the remaining profitable areas of the Puchong tin property in Malaya, leading to an eventual winding up of the company and distribution of the assets. This policy is, Mr. Binns says, opposed by Mr. Pike.

The weakness of Mr. Binns' proposals is, as he is the first to admit, the fact that if Mr. Pike opposes the capital return then through the 35 per cent shareholding of his Raybar Holdings company acquired in Ipoh earlier this year he could prevent the necessary majority being obtained for the requisite special resolutions. Who should the shareholders back? Mr. Pike, so far as is known, has no tin-mining experience. Nor has he, as yet, put forward his own ideas about the future of the company. These will certainly have to be known before he should be accorded any support.

There is a fifth director. He is Mr. J. G. Cowen who joined the Board last April to represent a substantial interest in Ipoh held by the big Straits Trading company. Meanwhile, Ipoh stand at 23s. in a narrow market. This compares with the 27s. cash bid by Mr. Pike for part of the capital last February. It is certainly to be hoped that Mr. Pike will put forward his views prior to the extraordinary meeting that has been called for September 14 at his request.

#### LONRHO UNDETERRED

Despite Rhodesia's political and racial troubles the London and Rhodesian Mining and Land company is pressing ahead with its expansion and diversification plans in that country as preliminarily outlined in June. The Board, of which Mr. S. K. Thorburn is chairman and Mr. Alan Ball managing director, views "with confidence the long-term prospects for the constitutional and economic progress of the Federation" and thinks that "all favourable opportunities should be taken to expand and diversify the sphere of the company's operations in anticipation of the general recovery which may be expected... when the present political difficulties have been overcome".

Lonrho's present deal consists of taking over a diverse bunch of assets from Mr. R. W. Rowland for a consideration not in cash but in the allocation of 1,500,000 Lonrho shares at par (5s.), not ranking for dividend until the year to September, 1962, and by an accompanying option to take up at 7s. a share a further 2,000,000 shares up to August 15, 1966. The latter shares will not be entitled to any dividend for the financial year in which they are subscribed and the option is not to be exercised before October 1 next. If Mr. Rowland's company, Shepton Estates (Private), takes up the whole 3,500,000 shares then it will own 46½ per cent of Lonrho's issued capital.

The deal will not, of course, affect Lonrho's profits for the year that ends on September 30 and on account of which the interim dividend has been raised from 4 to 5 per cent. For 1959-60 the final was 4 per cent. For the year to September, 1962, the directors estimate that consolidated profits before tax will be increased by £180,000 and that earnings on the higher capital of £1,375,000 should be approximately 20 per cent.

Lonrho have been a firm market recently and now stand at 8s. 1½d., which is double what they were at one time earlier this year. They look to have long-term possibilities but everything depends, of course, on Rhodesia achieving political stability. If all goes well in this respect, Mr. Rowland will presumably exercise his option which would provide the company with further funds of £700,000 for investment. There should be plenty of opportunity for using this profitably in a peaceful Rhodesia. The extraordinary meeting to consider the latest proposals will be held in London on September 21.

#### ASHANTI GOLDFIELDS CORPORATION

It is proposed to increase the share capital of Ashanti Goldfields Corporation Ltd. to £3,000,000 by the creation of 2,500,000 new ordinary shares of 4s. Extraordinary General Meeting on September 15, 1961.

#### COPPER IN YUKON

In the Watson Lake area, near the Yukon-British Columbia border, the Conwest Exploration Company has discovered an outcropping sulphide copper deposit and the strike has been traced for a distance of about 1,000 ft. The grab samples taken so far have shown values of up to 8 per cent and in a number of samples zinc values have been obtained. As yet it has not been possible to determine the average thickness of the ore-body but widths of up to thirty feet have been noted. It appears to be a flat dipping body of a replacement type, the sulphides replacing a chlorite schist bed. The Central Patricia Mines have a 20 per cent interest in the prospect with Conwest Exploration.

**East Rand Rights Issue.**—The directors have announced that of the recent offer to shareholders of 3,000,000 shares of 2s. each at par 52.1 per cent was taken up as of right, and 18.4 per cent allotted in full to excess applications whilst the balance (29.5 per cent) was taken up by the underwriters.

#### Board Changes

Sir Reginald Groom, Kt., formerly Lord Mayor of Brisbane, partner in the accounting firm of Groom Sanderson & Co., has joined the board of directors of Mount Isa Mines Limited. He fills the vacancy created by the death of the late Mr. A. J. Deakin.

Barclays Bank announce that Mr. Tuke will relinquish the office of chairman at the end of the annual general meeting in February 1962, but will remain a member of the board. Mr. John Thomson, now deputy chairman, has been nominated by the board for election as Mr. Tuke's successor. Sir Thomas Bland, one of the vice-chairmen of the Bank, has similarly been nominated by the board to succeed Mr. John Thomson as deputy chairman.

Mr. H. N. Hari has been appointed a director of the General Mining and Finance Corp. Ltd.

#### Book Review

The fifth edition of the Register of Old Students of the Royal School of Mines, 1961 has just been published. It contains 2,805 names with biographical details in as many instances as possible. The editor, Dr. J. H. Watson, who is Chemist and Assayer at the Royal Mint, is to be complimented on a considerable compilation. The price is 25s., plus postage.

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